

Environmental & Regulatory Services Division
Bureau of Petroleum Products and Tanks
201 West Washington Avenue
P.O. Box 7837
Madison, WI 53707-7837

Wisconsin COMM 10 Material Approval

Equipment: Tank Manager Automatic Tank Gauge
System and Liquid Sensors

Manufacturer: Caldwell Systems Corporation
600 South Sunset St., Unit D
Longmont, CO 80501

Expiration of Approval: December 31, 2008

SCOPE OF EVALUATION

The Caldwell Automatic Tank Gauge System has been evaluated for use as leak detection equipment conforming to specified portions of **ss. COMM 10.61** and **COMM 10.615** of the current edition of the Wisconsin Flammable and Combustible Liquids Code.

This evaluation summary is condensed to provide the specific installation, application and operation parameters necessary to maintain the subject systems in compliance with the Wisconsin Administrative Code – Comm 10.

DESCRIPTION AND USE

The Tank Manager is a permanently installed leak detection system for underground storage tanks. The system consists of an electronic console, in-tank probes for liquid level sensing, and optional sump/ interstitial sensors.

The system provides graphic and text display of the data for current status, alarms, inventory control and tank leak detection. The Tank Manager console contains all of the electronics for tank probes, sump and interstitial sensors and vapor sensors, including an integral 20 column graphic printer and a graphic liquid crystal display. The integral modem and RS232 communications ports provide for telephone access to the data and on site interfacing to personal computers, totalizers (dispensers) and point of sale terminals.

The tank report shows the results of each of the last 15 valid tests. Tests, which are not valid, are not saved. Invalid tests are those, which have test conditions that preclude determining a conclusive test result, leak or no leak. Data is collected from midnight until 6 AM for a total of 6 hours. The system then checks for quiet time and other conditions (as shown below), if all conditions not OK, test result is not saved. Testing is conducted every night and the last 15 valid tests are saved for printout. If by the 23rd day of the monthly test a valid test result has not been completed, the console will alarm to notify the operator to perform a manual test.

The Tank Manager liquid sensor is designed to detect the presence of liquids in containment sumps, the interstitial space of double-walled piping, double-walled tanks, and other places that are normally dry. The sensor is positioned in the space at the depth where it should alarm. It can be positioned vertically or horizontally. It will alarm when liquid is present from one end of the sensor tube to the other. It is an ultrasonic sensor, and works by transmitting a sound pulse that travels to the opposite end of the sensor and bounces back. This is detected at the Tank Manager console. If the space is dry, no reflection appears.

The sensor is non-destructive and recovers as soon as liquid is removed. It discriminates between gasoline products and water. The sensor can be used with cable runs of up to 400 feet or with a multiplexer.

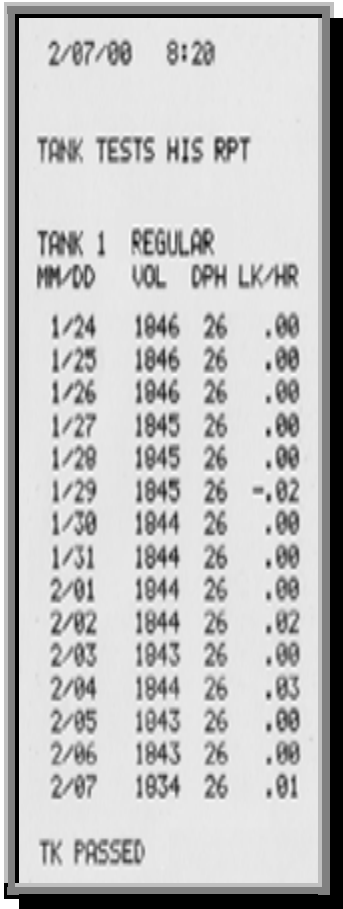
The Automatic Tank Gauge (ATG) system may be used with gasoline, diesel fuel, aviation fuel, fuel oil #4, and used oil that is pure oil-not mixtures of oils, gasoline or solvents, etc.

TESTS AND RESULTS

Ken Wilcox Associates tested the Caldwell Automatic Tank Gauge System in accordance with the EPA testing protocol for automatic tank gauges and for annual tank tightness tests. The Caldwell Tank Monitor System was found capable of detecting a 0.2-gallon per hour leak with a probability of 99.9 percent and a probability of false alarm of 0.1 percent. The Caldwell Tank Monitor System was found capable of detecting a 0.1-gallon per hour leak with a probability of 96.7 percent and a probability of false alarm of 3.3 percent.

MONITORING SYSTEM OUTPUT

Detailed here is an example of a typical Tank Leak Report. (Site Name/Address is printed on report)



TANK 1 REGULAR			
MM/DD	VOL	DPH	LK/HR
1/24	1846	26	.00
1/25	1846	26	.00
1/26	1846	26	.00
1/27	1845	26	.00
1/28	1845	26	.00
1/29	1845	26	-.02
1/30	1844	26	.00
1/31	1844	26	.00
2/01	1844	26	.00
2/02	1844	26	.02
2/03	1843	26	.00
2/04	1844	26	.03
2/05	1843	26	.00
2/06	1843	26	.00
2/07	1834	26	.01

TK PASSED

Tank Leak Report Example: Last 15 valid test results.

LIMITATIONS / CONDITIONS OF APPROVAL**General**

- All monitoring equipment shall be installed, calibrated, operated, and maintained in accordance with the manufacturer instructions, and certified every 12 months for operability, proper operating condition, and proper calibration. Records of sampling, testing, or monitoring shall be maintained in accordance with **Comm 10.625**.

- The manufacturer shall submit for a revision to this Wisconsin Material Approval application if any of the functional performance capabilities of this equipment are revised. This would include, but not be limited to changes in software, hardware, or methodology.
- While 3rd party testing does determine a required minimum tank level, EPA leak detection regulations require testing of the portion of the tank system which routinely contains product. Consistent testing at low levels could allow a leak to remain undetected.

During leak testing, a minimum level of product in tank shall be maintained so as to ensure testing of the portion of the tank and/or piping that routinely contains product, regardless of testing system capability. For instance, if product levels are routinely maintained at 60%, but the leak detection system is capable of testing at 15% product level, then testing shall be performed at 60% levels.

- If performing a tank tightness test, minimum tank level shall be 95%, regardless of leak detection system minimum capability, in accordance with **Comm 10.61 (3)**.

Caldwell Tank Monitor 0.2 gph Monthly Testing

- Critical performance parameters for monthly 0.2 gph testing: (Ultrasonic probe)

Parameter	Value
Maximum Tank Size ¹	Up to 20,000 gallons
Software Version	N/A
Minimum Product Level	18 inches
Waiting time between filling tank and test start ² (Stabilization time dependant on tank conditions)	12 hours, 25 Minutes
Waiting time between dispensing and test start	15 Minutes
Minimum Test Period ³ . (Test time determined by microprocessor based on tank size and product level)	3 hours , 15 Minutes

1: Monthly and annual testing can only be performed on one tank at a time. If several tanks are manifolded together, an isolation valve will have to be installed so as to separate the tanks individually.

2: There must be no delivery during waiting time.

3: There must be no delivery or dispensing during testing.

Caldwell Tank Monitor 0.1 gph Tank Tightness Testing

- Critical performance parameters for 0.1 gph tank tightness testing: (Ultrasonic probe)

Parameter	Value
Maximum Tank Size ¹	Up to 20,000 gallons
Software Version	N/A
Minimum Product Level	18 inches
Waiting time between filling tank and test start ² (Stabilization time dependant on tank conditions)	12 hours, 25 Minutes
Waiting time between dispensing and test start	15 Minutes
Minimum Test Period ³ . (Test time determined by microprocessor based on tank size and product level)	3 hours , 15 Minutes

1: Monthly and annual testing can only be performed on one tank at a time. If several tanks are manifolded together, an isolation valve will have to be installed so as to separate the tanks individually.

2: There must be no delivery during waiting time.

3: There must be no delivery or dispensing during testing.

- All equipment shall be installed, operated and maintained in accordance with procedures specified by Caldwell Systems Corporation.

Liquid Sensors

- The Liquid Sensors shall be placed such that a release from any portion of the tank or piping will be detected.
- Sensors are designed to alarm only when liquid is present from one end of the sensor to the other.
- Sensor orientation (vertical or horizontal) will effect lower detection limit.
- Sensors are reusable.

This approval will be valid through December 31, 2008, unless manufacturing modifications are made to the product or a re-examination is deemed necessary by the department. The Wisconsin Material Approval Number must be provided when plans that include this product are submitted for review.

DISCLAIMER

The Department is in no way endorsing or advertising this product. This approval addresses only the specified applications for the product and does not waive any code requirement unless specified in this document.

Reviewed by: _____

Greg Bareta, P. E.
Engineering Consultant
Bureau of Petroleum Products and Tanks

Approved by: _____ Date: _____